second bullet contact assembly 18 for plug-in connection to load side equipment (not shown), such as a distribution panel. When fuse 12 is fully inserted into a switch housing assembly fuse receptacle 20, an electrical circuit is completed through fuse 12 via first and second bullet contact assemblies 16, 18. As such, fused disconnect switch assembly 10 is ideally suited, in an exemplary embodiment, for protecting telecommunications equipment from damaging fault currents as well as facilitating disconnection of the load by extraction of fuse 12 from switch housing assembly 14. It is understood, however, that the benefits of the present invention accrue generally to many fused systems, and the present invention is in no way intended to be restricted to any particular use or application.

[0025] Figure 2 is a cross-sectional view of fuse 12 (shown in Figure 1) including first and second fuse terminals 30 extending from a fuse housing 32 and in electrical communication with a primary fuse link 34 mounted in fuse housing 32 and extending between first and second terminals 30. When an electrical circuit is completed through fuse terminals 30, current flows through primary fuse link 34, and as current flowing through primary fuse link 34 approaches a predetermined threshold, i.e., a fault current, primary fuse link 34 melts, vaporizes or otherwise opens and prevents electrical current from flowing therethrough. Thus, an open circuit is created between fuse terminals 30 and associated load-side electrical components and circuits are isolated by fuse 12 and thereby protected from damaging fault currents. An arc-quenching material (not shown), such as silica sand, may surround primary fuse link 34 within housing 32 to prevent and/or suppress arcing between fuse terminals 30 when primary fuse link 34 opens.

[0026] In one embodiment, primary fuse link 34 is fabricated so that fuse 12 has a rating of 25 to 125 amps and a safety interrupt of 100kA at 80Vdc. In addition, different fuse ratings are obtained with differently fabricated primary fused links 34 inside fuse housing 32 so that differently rated fuses have substantially the same size and shape, or footprint, so that a variety of different fuses may be employed with a single switch housing assembly for versatility in the field. It is contemplated, however, that the benefits of the present invention accrue to a wide variety of fused systems employing fuses of different ratings, shapes, and sizes. Therefore, the specific embodiments illustrated and described herein are for illustrative purposes only and are not intended to limit the invention in any aspect.

[0027] Fuse 12 also includes a local and remote open-fuse indication device 36 for indicating an operational state of fuse 12. In one embodiment, device 36 includes a high resistance electronic circuit, explained in detail below, that illuminates a light emitting diode ("LED") 38 when primary fuse link 34 is opened. LED 38 is visible through a top 40 of fuse housing 32 and, when illuminated, readily identifies an operated fuse for replacement. When employed in electrical systems with a large number of fuses, local fuse state indication via LED 38 is a significant advantage over conventional fuses.

[0028] In an alternative embodiment, open-fuse indication device 36 includes a secondary fuse link (not shown in Figure 2) electrically connected between fuse terminals 30 in parallel with primary fuse link 34. The secondary fuse link has a much greater electrical resistance than primary fuse link 34 so that when fuse 12 is operational, i.e., when primary fuse link 34 has not opened, substantially all the current flowing through fuse 12 passes through primary fuse link 34. However, when primary fuse link 34 opens and the circuit is broken through primary fuse link 34, current flows through the secondary fuse link and triggers an electronic or mechanical indicator for local indication of the opened fuse via visual observation of fuse housing 32.

[0029] In further alternative embodiments, other known electrical, mechanical, or electromechanical devices are used to visibly indicate an operational state of fuse 12 for local fuse state indication.

[0030] Open fuse indication device 36 further includes an electrically conductive alarm terminal 42 protruding through an opening 44 in fuse housing 32. When fuse terminal alarm 42 is coupled to a resistive load, such as a relay coil (not shown) typically found in existing telecommunications equipment, a signal is sent to the relay coil when primary fuse link 34 has opened, thereby directing attention to a particular location where an opened fuse is located. Local fuse state indication identifies the open fuse or fuses in the specified location. Thus, opened fuses may be efficiently located even when large numbers of fuses in various locations are employed.

[0031] Figures 3 and 4 illustrate a first embodiment of switch housing assembly 50 including a housing 52 having fuse terminal openings 54 in a bottom 56 of fuse receptacle 20 for receiving fuse terminal blades 30 (shown in Figure 2). An electrically conductive resilient clip 58 is located below each fuse terminal

opening 54 and located in a cavity 60 below fuse receptacle 20. A bridge portion 62 extends downwardly from each clip 58 and to electrically conductive bullet contact assemblies 16, 18 for connection to either a line input bus (not shown) or a load bus (not shown). When fuse terminals 30 are inserted through fuse terminal openings 54, fuse terminals 30 are received in clips 58 and thus are electrically coupled to bullet contact assemblies 16, 18 protruding through a bottom 64 of housing 52.

[0032] A switch housing internal alarm terminal 66 is positioned adjacent one of fuse clips 58 within an adjacent cavity 68, and includes a projecting ridge 70 at a top end 72 that protrudes through an opening 74 in a side wall 76 of fuse receptacle 20. Thus, when fuse 12 is fully inserted into fuse receptacle 20, alarm terminal projecting ridge 70 contacts fuse alarm terminal 42 (shown in Figure 2) through housing opening 44 (shown in Figure 2). Internal alarm terminal 66 is further coupled to a remote output alarm terminal 78 that extends though a bottom 64 of switch housing 52, thereby completing an electrical path for an open fuse alarm signal for transmission to end use equipment (not shown) during an open fuse condition.

[0033] A fused disconnect switch assembly 10 (shown in Figure 1) is therefore provided that facilitates installation to existing equipment without auxiliary components or hand wired connections. Switching is achieved by inserting or extracting fuse 12 from switch housing fuse receptacle 20, and local and remote opened fuse indication provides ready indication of opened fuses for replacement. Because a variety of differently rated fuses are accommodated by switch housing receptacle 20, a versatile fused disconnect assembly 10 is provided that is suitable for a wide variety of applications.

[0034] Figure 5 illustrates a second embodiment of a switch housing assembly 100 in which common features of switch housing assembly 50 (shown in Figures 3 and 4) are referenced with like reference characters. Switch housing assembly 100 is configured for use with a removable fuse, such as fuse 12 (shown in Figures 1 and 2). Unlike switch housing assemblies 50, switch housing assembly 100 includes a terminal stud assembly 102 in lieu of bullet contact assembly 18. Terminal stud contact assembly 102 includes a bridge portion 62 extending downwardly from electrically conductive clip 58. Terminal stud contact assembly 102, in one embodiment, is fabricated from steel and attached to bridge portion 62, while in an alternative embodiment terminal stud contact assembly may be integrally formed with bridge portion 62. Terminal stud 102 contact assembly includes threads (not shown)